Note: Illustrations 1-6 have been omitted from this version of the document to reduce file size. Please open EA-99-08 to view the illustrations, or request a paper copy from the Eugene District Office by contacting Chuck Vostal at (541) 683-6454.

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EA-99-8

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
EUGENE DISTRICT OFFICE

Environmental Assessment
Big River - Edwards Creek Aquatic Habitat Restoration
EA No. OR-095-99-8

I. PURPOSE AND NEED FOR ACTION

The Bureau of Land Management (BLM) Eugene District, South Valley Resource Area, proposes to enhance fish habitat and restore connectivity to upstream habitat in Big River and Edwards Creek during the summer of 1999. The Proposed Action would occur on approximately 3 miles of stream channel in Sections 7, 8, 16, and 17, T. 23 S., R. 2 W., and Section 12, T. 23 S., R. 3 W., Willamette Meridian, Lane County, Oregon (see maps 1 and 2). The project is located on BLM and Weyerhaeuser Company managed lands. The BLM Land Use Allocation (LUA) for Big River and Edwards Creek is Late-Successional Reserve (LSR). The purpose of the Proposed Action is to enhance habitat for the various life stages of fish and other aquatic species and to improve passage to suitable upstream habitat. The need for the action is established by: 1) the lack of large structural elements within Big River and Edwards Creek, such as large woody debris and boulders that create habitat for the various life stages of aquatic biota; 2) existence of a human caused barrier to aquatic species movement and dispersal to upstream habitat; and 3) hardwood dominance in the stream side influence zone and portions of the riparian, and lack of future large woody debris in these areas.

Watershed analysis (WA) has been completed for the Cottage Grove Lake/Big River Watershed Analysis Unit (May 1997). The watershed analysis stated that Big River and Edwards Creek would benefit from stream restoration to increase channel complexity and spawning and rearing habitat for resident trout. It also recommended mitigating passage barriers (e.g., problem culverts) to upstream habitats for fish and other aquatic-dependent organisms.

Conformance with Land Use Plan

The Proposed Action and Alternative are in conformance with the "*Record of Decision for Amendments to the Forest Service and Bureau of Land Management Planning Documents within the Range of the Northern Spotted Owl*" (NSO & ROD, April 1994),

and the "*Eugene District Record of Decision and Resource Management Plan*" (RMP, June 1995) that direct aquatic ecosystems be maintained and restored to meet the Aquatic Conservation Strategy (ACS) Objectives.

II. PROPOSED ACTION AND ALTERNATIVES

A. Proposed Action

The Proposed Action is designed to achieve the following objectives.

- Increase stream channel complexity in Big River and Edwards Creeks in order to increase the productive capability for resident salmonids and other aquatic organisms.

- Increase the stability of the stream channel in order to retain woody material and sedimentary materials in the channel.

- Increase the water storage capability, and moderate streamflow patterns during low and high flow periods.

- Improve passage to upstream habitat for migrating fish.

- Develop future coarse woody debris in the riparian or stream channel.

- Increase the angling opportunities in the Big River basin.

The project would involve the construction of 21 instream structures in Big River and 20 structures in Edwards Creek. Approximately 3 acres in the project area would be converted to conifers.

1. Channel Complexity

Under the Proposed Action, logs and boulders would be placed in the stream channel as individuals, clusters, jetties and ramps, or jams and weirs (see attached illustrations). Placement of material in the stream would be by excavator. At most locations the excavator would work up and downstream from the point of entry to reduce the number of access points. Following placement of materials, key logs and boulders would be anchored using epoxy and cable to stabilize the structures.

Approximately 1,300 boulders would be hauled by truck from an existing rock quarry 11 miles from the project area. Approximately 200 logs, averaging 50 cm. in diameter by 13 meters in length, would be hauled to

each site from a storage yard at an outside location. Materials would be stockpiled at designated locations adjoining the project reaches. The materials would be moved from the stockpiles into the channel using front-end loaders. Instream work would be accomplished by an excavator. Some on-site material would be utilized for structure development.

Access to the project area would be on existing paved roads. Temporary access from the paved roads to the stream channel would be developed through the riparian area. Access routes would be designed on the least amount of distance to each instream project site, and the avoidance of large conifers, large coarse woody debris, and mollusk sites. Preparation of access routes would include removal of brush and hardwood/conifer trees (primarily red alder). At several proposed access points, existing old accesses are present and would be reopened in lieu of creating new access routes. Following completion of project work, access routes would be subsoiled (ie. mechanically breaking up compacted area) and blocked.

Instream project work would take place during low flow conditions, between August 1 and September 15. Oregon Department of Fish and Wildlife instream work guidelines for this area are July 1 through October 15. All necessary permits from County, State, and Federal agencies, including ODFW approval, would be obtained prior to start-work date.

2. Culvert Passage

Under the Proposed Action, a log and boulder structure would be installed just below twin culverts (figure1) in Big River in the southeast 1/4 Section 7, T.23 S., R.2W., (Road No. 23-3-5.4). The objective would be to elevate the tailwater elevation or stream gradient downstream, thus raising the water level within the culvert to an acceptable depth for juvenile and adult fish passage during most flow conditions. The backing up of water and increasing the overall water depth would also lessen the flow velocity within the pipe, allowing fish to maneuver through the 60 ft. culverts. In addition, this structure would provide downstream resting pools immediately below the culvert.

Material delivery and structure construction would occur as described under **Channel Complexity**.

Figure 1 - Twin culverts located in Big River (Road No. 23-3-5.4).

3. Riparian Conversion

Riparian conversion would be associated with access roads and disturbed streambanks. Most of the proposed access roads are dominated by red alder and a minor amount of conifers. Trees in these access roads would be felled and left on site. Upon completion of instream work and subsoiling, material would be scattered over the disturbed area as coarse woody debris (CWD). Some larger conifers may be used as instream structure. In the subsequent planting season, access roads would be planted with a mix of conifers, primarily western redcedar and Douglas-fir. It is estimated that 3 acres of the project area would be converted to conifers at a density of 400 trees per acre.

B. ALTERNATIVES TO THE PROPOSED ACTION

No Action - Under the No Action alternative, stream structures would not be constructed. Maintenance of the culvert described above would occur on an as-needed basis, but there would be no attempt to eliminate passage restriction.

III. ALTERNATIVE CONSIDERED BUT DROPPED FROM FURTHER ANALYSIS

An alternative considered would replace the culvert with a bottomless arch pipe or prefabricated bridge, plus similar instream restoration as described in the Proposed Action.

The existing culverts would accommodate a flood event exceedance probability of 50-100 years. Both culverts are structurally sound. The preferred structure for fish and other aquatic species at this crossing would be either a prefabricated bridge or bottomless pipe arch, with both structures providing a natural channel bottom and natural flow conditions. But, due to the size, condition, and adequacy of the existing pipes, and the expensive replacement cost, this alternative was not analyzed any further. It is anticipated with downstream structures that the water level within the pipe can be raised to a sufficient level to improve upstream migration of fish and other aquatic species.

IV. AFFECTED ENVIRONMENT

A. Aquatic Habitat and Fisheries Resources

Big River at the project area is a 5th order stream. It originates on the western slopes of Huckleberry Mountain in the Cascade Range foothills, southeast Lane County, Oregon. The stream flows westerly, then turns northward to combine with Garoutte Creek and create the Coast Fork Willamette River.

Historically, Big River had runs of anadromous salmonids, predominantly spring chinook and steelhead. Resident cutthroat trout, rainbow trout, and bull trout were probably also present. A series of logging pond dams on the Coast Fork Willamette and Big River blocked access to anadromous fish. Dams in Big River were found upstream to the London area, approximately 5 miles downstream from the project location. While the mill pond dams are no longer barriers, the dam creating Cottage Grove Reservoir created a permanent barrier to upstream migrating fish. Both cutthroat and rainbow trout, along with a variety of warm-water species, have been planted in Cottage Grove Reservoir.

Big River was inventoried in the project area in 1997 by the Oregon Department of Fish and Wildlife. Older inventories are available but lack the detail of more recent inventories. The channel is constrained alternately by terraces and hillslopes with a broad valley floor. Average gradient is 1.5 percent. Stream habitat is composed primarily of scour pools, riffles, and rapids. Where structure or constrictions are present, several quality pools have developed. Otherwise, pool habitat tends to be sparse and of poor quality. Substrates are dominated by bedrock, cobble and rubble, and gravels. Wood volume averages around 13.5 cubic meters per 100 meters of stream channel. Higher volumes of wood are

present in upper reaches where several larger trees have created debris and sediment accumulations. Riparian vegetation includes areas with mature Douglas-fir, western red cedar, western hemlock, and grand fir, and areas dominated by red alder 3-30 cm in dbh.

In 1997 BLM sampled several habitats in Big River for fish distribution. Species richness is extremely low, with only sculpins and cutthroat trout being captured. The only trout exceeding 12 cm were in a large scour pool under the Edwards Creek Road bridge. It is postulated that fish from downstream, including Cottage Grove Reservoir, use both Big River and Edwards Creek for spawning, with fish moving upstream during the winter migratory period.

Edwards Creek is a 4th order tributary entering in Section 7, T. 23 S., R. 2 W.; it originates on the ridge dividing Big River from Mosby Creek. Edwards Creek has 2 main forks. The Oregon Department of Fish and Wildlife in 1997 inventoried the main stem of Edwards Creek and the lower portions of the West Fork. The East Fork, smaller of the 2, flows in a confined valley bordered by young conifer. There is one beaver-created wetland near the mouth that provides good aquatic habitat. The channel has several landslides and debris accumulations. Cutthroat trout are present, and probably also sculpin.

The West Fork has 3 reaches with variable conditions. The lower reach is unconstrained by multiple terraces. The stream side vegetation is second growth conifer and deciduous trees under 15 cm in dbh. Gradient is about 4 percent. Substrates are primarily cobble, rubble, and boulder in rapids and cascades type habitat. This reach has moderate amounts of woody material, mostly logging remnants. The middle reach is moderately confined in a V-shaped valley, bordered by young conifer and deciduous trees. Gradients average 5 percent, with predominantly rapid-cascade habitat and cobble-rubble-boulder substrate. The reach has moderate amounts of woody material, mostly logging remnants. The upper reach is similar to the lower and middle reach but is more confined and steeper, with a series of falls over bedrock and boulders. In the upper and middle reaches, the stream gradient moderates somewhat before climbing again. Cutthroat trout are present in the lower reach and portions of the upper reaches.

Main stem Edwards Creek (figure 2) flows through a gradually widening valley, eventually crossing the Big River delta before entering into Big River. The channel is initially unconstrained, becoming increasingly constrained upstream, being highly constrained near the forks. Gradients average 2 percent. Substrate is highly variable, and is closely related to the riparian vegetation. The lower reaches are bordered by mature conifers. Several of these trees have fallen over and into Edwards Creek. Where structure is present, the dominant substrates are cobble-rubble and gravel. In the absence of structure, the stream channel is nearly

all bedrock. Pool habitat is limiting and generally shallow and lacking in cover. Cutthroat trout and sculpin are present but numbers are modest.

Figure 2 - Upstream view of Big River illustrating hardwood dominated stream influence zone and lack of instream structure.

B. Wildlife (including Special Status and Special Attention Species)

Sections 5 and 7, T.23 ., R. 2 W., are identified as critical habitat for northern spotted owls (Critical Habitat OR-CHU-25) and suitable nesting habitat. An historic spotted owl site is located in Section 7, lower Edwards Creek. This pair is more often found in Section 5, but Section 7 does get some use.

The project area is defined as suitable habitat and within the expected range of 3 of the 4 Survey and Manage species present on the Eugene District: *Megomphix hemphilli* (Oregon megomphix), *Prophysaon coeruleum (*Blue-grey tail-dropper), and *Prophysaon dubium* (Papillose tail-dropper). Surveys were conducted as directed in current protocols in and near all access routes, log and boulder stockpile locations, and other suitable habitats. The survey detected 51 known sites with one or more of the above mentioned species present.

C. Vegetation and Botany Resources

Most of the project area is composed of a diversity of hardwoods and late-seral stage conifers. Large conifers are more abundant in the project area and adjacent lands than in most other areas in the watershed. Riparian overstory vegetation along the immediate streambanks and some flood plain is characterized by a persistent hardwood-dominated canopy (predominately red alder) interspersed with late-seral stage conifers. A small portion of the project area (Upper Edwards Creek) is comprised of young-seral stage conifers and a hardwood dominated stream side influence zone. Understory species consist of vine maple, salal, sword fern, deer fern, salmonberry, and Oregon grape. The project area has a moderate amount of large diameter snags. Large and small diameter coarse woody debris is abundant throughout.

An in-season vascular plant survey was completed. *Mimulus cardinallis* was detected at Edwards Creek Site # 14. This is the northernmost population known to date. The population is located in a line along the east side of the creek, and does not appear to be directly in the project area but adjacent to it. The current status of the plant is "Eugene District Review". No sensitive species or other species of concern were detected within the project area.

D. Cultural Resources - No cultural resources have been identified in the project location.

IV. ENVIRONMENTAL CONSEQUENCES

A. UNAFFECTED RESOURCES

The following are either not present or would not be affected by any of the alternatives: Areas of Critical Environmental Concerns, prime or unique farmlands, flood plains, Native American religious concerns, solid or hazardous wastes, Wild and Scenic Rivers, Wilderness, minority populations, and low-income populations.

B. DIRECT AND INDIRECT EFFECTS OF THE PROPOSED ACTION

Direct effects of the Proposed Action would be the removal of riparian overstory and understory vegetation, soil compaction and displacement, and an increase in channel and streambank disturbance with associated transient increase in sediment to the stream system.

1. Soils

Equipment access from paved roads into the stream would require the development of temporary access roads. At several locations, older accesses, probably for past timber management activities, are already present and would be utilized, thus reducing the amount of new disturbance to the riparian area. Most access roads are located on flat topography (< 3% gradient) and well drained soils, thereby reducing the potential for mass soil movement.

Construction of new or reopening of old access roads would result in: 1) the removal of vegetation, primarily brush species and hardwood trees (red alder), and some small conifer trees; 2) soil and litter displacement; and 3) soil compaction. Minimal compaction is anticipated since the project would be implemented during the summer season when soil moisture content is low. Soil and litter displacement is also expected to be low as most access roads would have limited equipment passes and would be kept to minimal widths.

Upon completion of instream work, compacted access roads would be subsoiled with the excavator, and felled trees and shrubs would be scattered over the disturbed sites, thus reestablishing permeability and organic layer. Access roads would also be blocked at the completion of work.

Soil exposure is not expected to persist for more than 1-3 years before full vegetation cover is reestablished.

2. Water Quality

The Proposed Action would alter the stability of streambanks and the streambed. Mechanically maneuvering logs and boulders within the channel would lead to the removal of protective vegetative cover, causing bank erosion and resulting in short-term and local transient increase in silt in the stream and increased turbidity. Disturbed streambanks would be protected with the placement of large and small woody debris and boulders to reduce erosion/sedimentation and, if necessary, planted with shade tolerant tree species in the subsequent planting. Damage to streambanks would be short-term once vegetation is reestablished. Long-term water quality would improve after project implementation in areas where instream and riparian work is complete. Increases in turbidity should return to natural levels shortly after the project is completed or the first fall rains.

Erosion control measures would be implemented before fall rains in any areas that show the potential for continued erosion, channelization, or sediment delivery to Big River or Edwards Creek. No erosion losses are anticipated beyond the short-term effects described above.

No measurable increases to stream temperature are predicted as a result of the Proposed Action. Vegetation removal from access roads constitute a very small portion of the stream side influence zone.

3. Fisheries

The volume of large woody debris (LWD) and boulders would immediately increase in the stream and on the flood plain. This increase would directly affect the amount of habitat cover and stream depth available for fish species in the project area.

As a result of the Proposed Action, the project area would receive large "key" structures that would trap and retain smaller debris in the system. Reduction of water velocities, maintenance of flow levels, stability of the channel, deposition of substrates, retention of organic material, and increases in aquatic habitat complexity would be expected to occur during the first winter following project implementation. Populations of aquatic organisms would benefit from the changes in the stream channel complexity caused by the addition of LWD and boulders. Long-term impacts include alteration of the stream channel as a result of the placement of structural materials. The projects are expected to increase the amount and diversity of substrates, with more smaller particles and less bedrock. The prevalence and quality of pools are expected to increase. Channel habitat diversity, spawning and rearing habitat, cover, and overall productivity for aquatic organisms are expected to increase.

Modification of the channel and subsequent increase in water level downstream of the culvert would increase the ability of fish to pass upstream at a greater range of stream flows, improving the connectivity of the stream communities and opening additional spawning habitat for upstream migrants.

4. Vegetation and Botany Resources

Riparian conversion would increase the percentage of conifers in areas currently dominated by hardwood trees, primarily red alder. Planted conifers would be considered a long-term future source of large woody material for the riparian and channel habitat.

The *Mimulus cardinallis* site located at Edwards Creek Site # 14 would be protected with a buffer, and equipment would be restricted from entering the site. No impacts to the site are anticipated.

5. Wildlife - Threatened and Endangered Species (Endangered Species Act)

Northern Spotted Owl - The project may affect spotted owls due to disturbance but is not likely to adversely affect them because project implementation would occur in August after the critical nesting period. Informal consultation with the U. S. Fish and Wildlife Service has been completed, and they concurred with the determination. The project is located in critical habitat unit OR-25. The effects of the project would be negligible, and are considered to have no effect on critical habitat.

Survey and Manage Mollusks - In accordance with current District guidelines, 26 of the 51 sites detected during the survey would receive a 30-foot radius (minimum) "No-entry Reserve". Access roads and material storage areas would avoid entry into these areas. These sites are well distributed throughout the project area. These 26 sites would be unaffected by the project.

The remaining 25 sites would not receive reserves, and some number of them could be affected in unknown degrees depending on the type of disturbance from the project design. Sites affected by the project are expected to be recolonized from nearby reserve sites.

C. DIRECT AND INDIRECT EFFECTS - NO ACTION ALTERNATIVE

Under the No Action Alternative, stream and riparian conditions would remain the same for the near future unless modified by natural processes such as flooding. Stream channel habitat and riparian conditions would continue to respond to existing processes, with some recovery of aquatic habitat expected over time. Since there are some larger trees in the riparian area to provide potential habitat, recovery of stream channel habitat is expected to proceed at a more rapid rate than in streams where larger trees are lacking, but still at a substantially slower rate as compared to the Proposed Action.

Riparian vegetation would continue to remain with vegetation communities similar to those now present. Riparian vegetation dominated by red alder is expected to develop a higher percentage of conifers, but at a slower rate and over a longer period of time than if conversions were implemented.

The existing culverts would continue to hinder upstream migration of fish and other aquatic biota.

D. EFFECTS ON AQUATIC CONSERVATION STRATEGY OBJECTIVES

This restoration project meets the Aquatic Conservation Strategy Objectives (ACSO) by maintaining/restoring distribution, diversity, and complexity of the watershed to which species are uniquely adapted (objective # 1), maintaining/restoring spatial and temporal connectivity within and between the watersheds (objective # 2), maintaining/restoring the physical integrity of the aquatic system (objective # 3), and maintaining/restoring species composition and ensuring large woody debris (LWD) recruitment (objective # 8).

E. CUMULATIVE EFFECTS

No adverse cumulative effects to the aquatic or terrestrial environment are anticipated from the Proposed Action.

It is anticipated the Proposed Action will restore the spatial and temporal connectivity within the watershed by improving accessibility to upstream migrating fish. In the long-term, the in-channel project work will increase the diversity and stability of the channel, increase spawning and rearing habitat, increase cover, and increase overall productivity for aquatic organisms. Riparian areas currently dominated by hardwoods will have an increased percentage of conifers and be a future source of large woody debris.

Survey and Manage Mollusks - Populations of these mollusks appear capable of surviving and/or recolonizing after some local disturbances such as thinning harvests. The Proposed Action is not expected to pose a risk to local viability or distribution of the 3 mollusk species. Restoration of riparian conditions would ultimately improve future habitat conditions for mollusks.

F. MONITORING AND EVALUATION

Habitat inventories and fish sampling conducted in 1997 serve as the baseline for inventory and evaluation of projects. A photographic record would be made of each project site prior to and after project work. Monitoring would involve observation of the project locations during various flows, and comparison of habitat structures and channel composition compared to the photographic record. As resources permit, fish sampling using electrofishing and/or snorkeling would be conducted at project locations with populations compared to the prework samples.

V. CONSULTATION & COORDINATION

A. List of Preparers

Chuck Vostal	Fisheries Biologist - Project Lead - BLM
Neil Armantrout	Fisheries Biologist, Sr. Staff Specialist - BLM
Mike Blow	Wildlife Biologist - BLM
Alison Center	Wildlife Biologist T&E Species - BLM
Rick Colvin	Landscape Planner - BLM
Carole Jorgensen	Wildlife Biologist - BLM
Mike Southard	Archeologist - BLM
Steve Steiner	Hydrologist - BLM
Molly Widmer	Botanist - BLM

B. Consultation

No candidate, proposed, or listed threatened and endangered fish species under the Endangered Species Act (ESA) exist in the Big River/Cottage Grove Lake Watershed. The project area is within a historic Northern Spotted Owl site. Informal consultation with the U. S. Fish and Wildlife Service has been completed. They concurred with the BLM Eugene District determination of "May Affect, Not Likely to Adversely Affect". The project is covered under the programmatic biological opinion for disturbance in the Willamette Province for 1999. The project proposal would also be reviewed prior to beginning any project work by the Oregon Department of Fish and Wildlife, Oregon Department of Lands, Local Soil and Water Conservation Board, and Lane County Planning Department.

The project plan was developed with the cooperation of Weyerhaeuser Company, the adjoining landowner. Project locations on private land would be submitted to Weyerhaeuser Company for review. Any projects undertaken by BLM on private lands would occur only with the written agreement of the private landowner. BLM has the authority to implement in-stream restoration under the Wyden Amendment where there is a benefit to the public and where the landowner willingly agrees to such projects.

C. Public Participation

This environmental assessment (EA) will be sent to the following list of groups, agencies, and individuals:

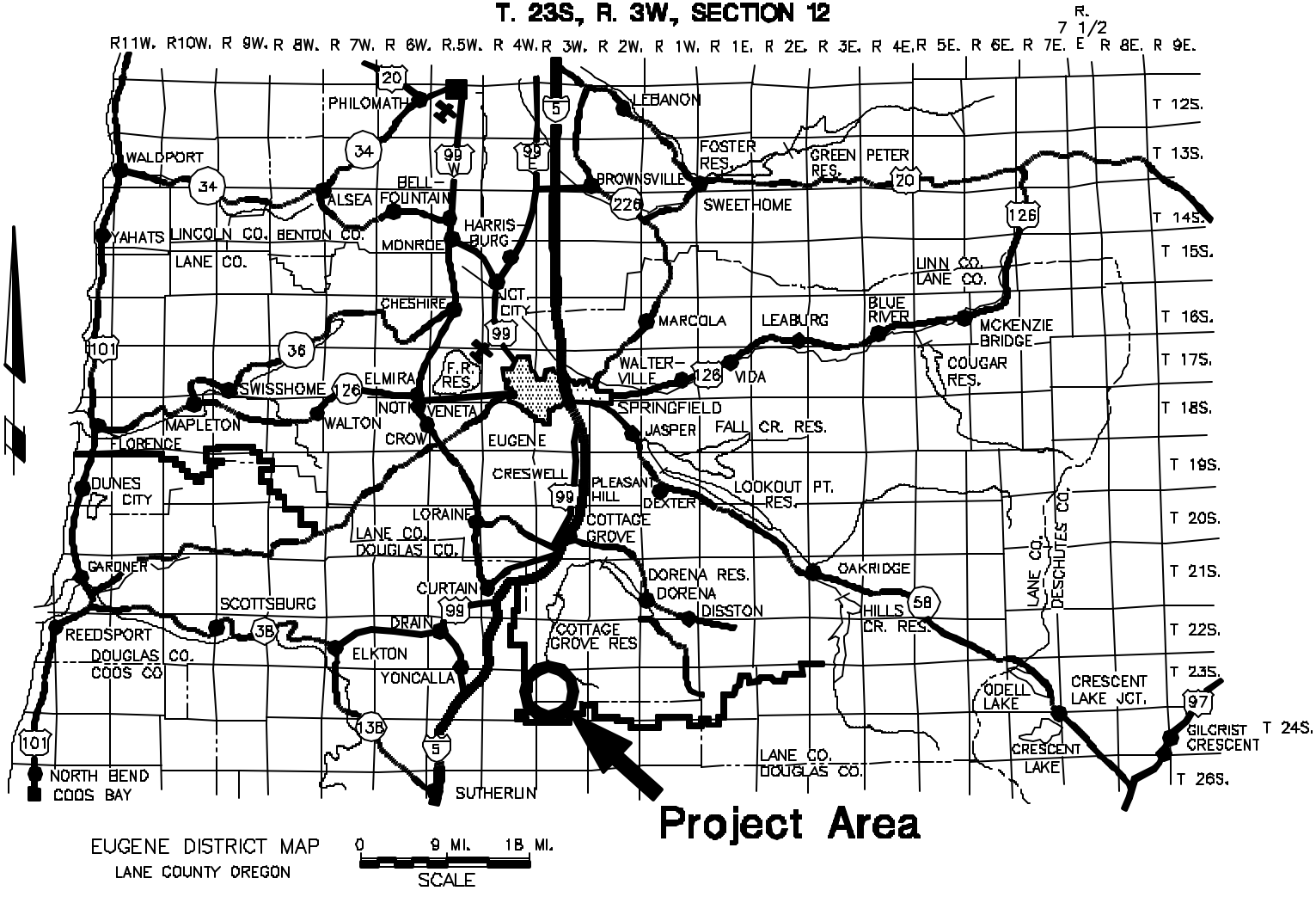
John Bianco, Creswell, OR
Confederated Tribes of the Siletz, Siletz, OR
Confederated Tribes of the Grand Ronde, Grand Ronde, OR
Governor's Forest Planning Team, Salem, OR
Pam Hewitt, Marcola, OR
Carol Logan, Kalapooya Sacred Circle Alliance, Springfield, OR
Charles and Reida Kimmel, Eugene, OR
Lane County Land Management, Eugene, OR
Ann Mathews, Eugene, OR
Neal Miller, Eugene, OR
Oregon Dept. of Environmental Quality, Portland, OR
Oregon Dept. of Fish and Wildlife, Springfield, OR
Oregon Dept. of Forestry, Springfield, OR
Oregon Natural Resources Council, Eugene, OR
Pacific Rivers Council, Eugene, OR
John Poynter, Lorane, OR
Roseburg Forest Products, Roseburg, OR
Peter Saraceno, Eugene, OR
Harold Schroeder, Eugene, OR
` Sierra Club - Many Rivers Group, Eugene, OR
David Simone, Eugene, OR
Swanson-Superior Forest Products, Inc., Noti, OR
Craig Tupper, Eugene, OR
Western Environmental Law Center, Eugene, OR
Jan Wroncy, Eugene, OR

ILLUSTRATIONS

Big River - Edwards Creek Aquatic Habitat Restoration

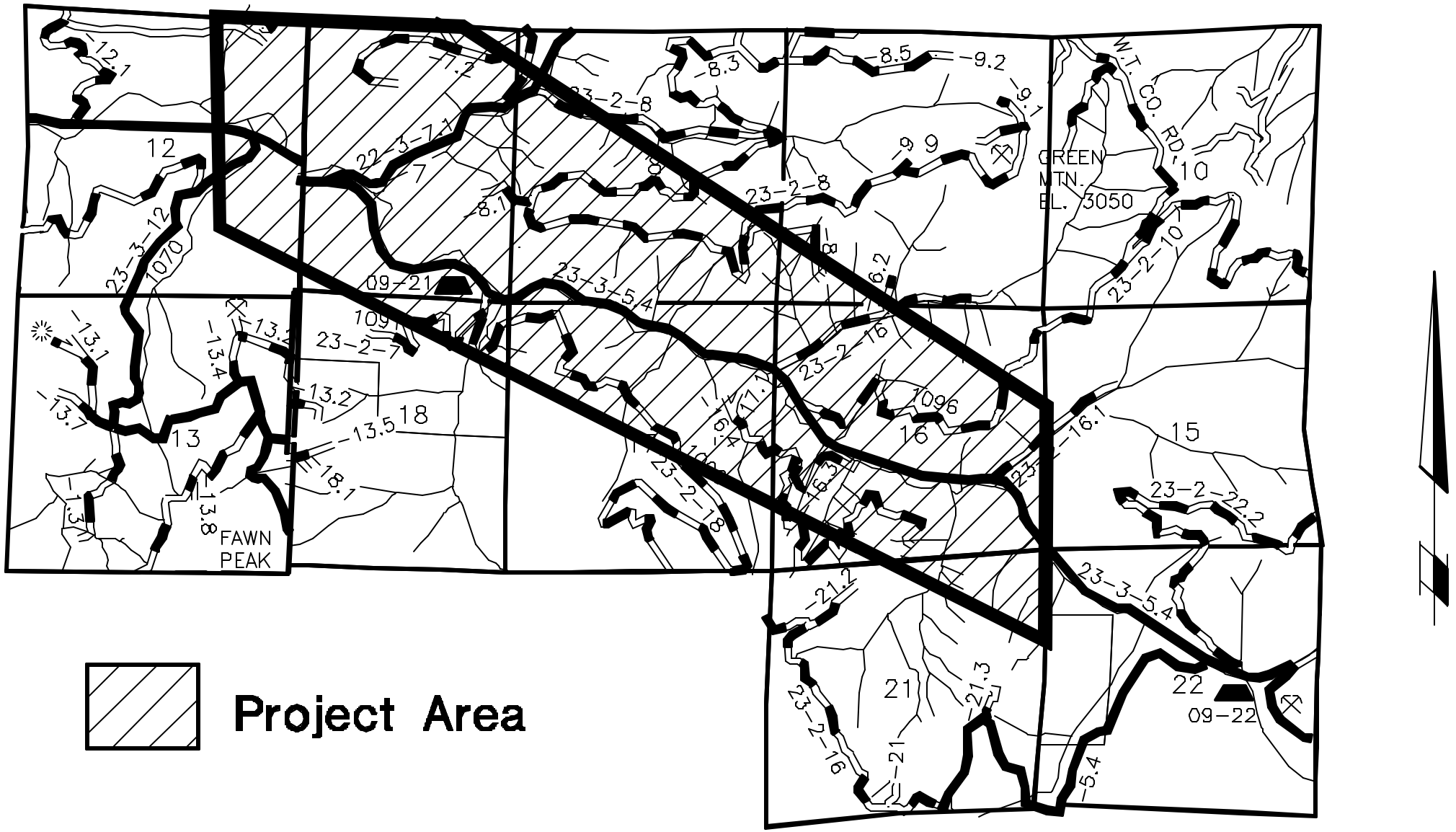
T. 23S., R. 2W., SECTIONS 7, 8, 16, 17

T. 23S., R. 3W., SECTION 12



Big River - Edwards Creek Aquatic Habitat Restoration

T. 23S., R. 2W., SECTIONS 7, 8, 16, 17
T. 23S., R. 3W., SECTION 12



Project Area

UNITED STATES DEPARTMENT OF INTERIOR
BUREAU OF LAND MANAGEMENT
EUGENE DISTRICT OFFICE

Finding of No Significant Impact
for
Big River - Edwards Creek Aquatic Habitat Restoration

Determination:

On the basis of the information contained in the Environmental Assessment, and all other information available to me, it is my determination that implementation of the Proposed Action or Alternative will not have significant environmental impacts not already addressed in the *Record of Decision (ROD) for Amendments to Forest Service and Bureau of Land Management Planning Documents Within the Range of the Northern Spotted Owl* (April 1994) and the *Eugene District Record of Decision and Resource Management Plan* (June 1995), with which this EA is in conformance, and does not, in and of itself, constitute a major federal action having a significant effect on the human environment. Therefore, an environmental impact statement or a supplement to the existing environmental impact statement is not necessary and will not be prepared.

_____ Date: _____
Field Manager, South Valley Resource Area

ENVIRONMENTAL ASSESSMENT NO. OR095-99-8

Big River - Edwards Creek Aquatic Habitat Restoration

Prepared by
Chuck Vostal
Fisheries Biologist

May 1999

United States
Department of the Interior
Bureau of Land Management
Eugene District Office
South Valley Resource Area